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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,589	07/17/2003	Jong-Kwon Kim	5000-1-329	2611

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EXAMINER	
LE, THI Q	
ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/621,589	KIM ET AL.	
	Examiner	Art Unit	
	Thi Q. Le	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2003 and 14 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/14/2005*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

2. The information disclosure statement (IDS) filed on 7/14/2005 was considered by the examiner.

Claim Objections

3. **Claim 8** is objected to because of the following informalities:

Claim 8 claims dependency upon claim 1; however, the subject matter within claim 8 refers to claim 7. The examiner believes that the applicant mistakenly claims claim 8 as dependent upon claim 1; when claim 8 should have been dependent upon claim 7. For the purpose examining this application, the examiner consider claim 8 as dependent upon claim 7.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 1-3, and 5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Kyong et al. (Japanese Publication JP08162697)** and further in view of **Inada et al. (US Patent # 6,920,261)**.

Consider **claim 1**, Hidenori et al. clearly show and disclose; an optical source generator for wavelength-division-multiplexing optical communication systems, comprising: a pumping-light generation section (read as, excitation light source, 14) for generating and outputting pumping lights (Drawing 1; paragraph 0024); a wavelength-division multiplexer/demultiplexer (read as, Mul/Demul, 12), provided with one multiplexing port and a plurality of demultiplexing ports, for wavelength-division-multiplexing and outputting optical signals inputted into the multiplexing port, and for wavelength-division-demultiplexing and outputting optical signals inputted into the demultiplexing ports (Drawing 1; paragraph 0026); a plurality of wavelength-dependent reflectors (read as, reflective components, 18-1 – 18-n), each connected to one of the

respective demultiplexing ports of the wavelength-division multiplexer/demultiplexer, for reflecting only optical signals that have a particular wavelength that corresponds to one of the respective said demultiplexing ports (Drawing 1; paragraph 0029).

Hidenori et al. fail to disclose; a plurality of optical fiber amplifiers, each having two sides one side of which is connected to one of the associated wavelength-dependent reflectors, for generating spontaneously emitted lights in response to pumping lights generated from the pumping-light generation section.

In related art, Kyong et al. disclose a variable wavelength multiwavelength optical fiber laser composition by the use of a single pump light. Wherein, the output from the pump light source is first demultiplex into a plurality of paths. Using a plurality of Erbium doped fibers (read as, optical fiber amplifiers), signal from each path is amplify; then isolated and later filtered to form a plurality of optical wavelength (Drawing 1; paragraphs 0010-0012).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Kyong et al. with Hidenori et al. If an single amplifier is use to amplify every wavelength, there would be "bandwidth hogging". That is when a particular wavelength has higher intensity than other, and then when all wavelengths get amplified the wavelength with higher intensity will get amplify more; thus causing the higher intensity wavelength to hog the bandwidth. By using individual amplifiers for each wavelength, this problem can be eliminated.

Hidenori et al. as modified by Kyong et al. disclose the invention as described above, except for; an optical path converter for outputting the pumping lights generated and received from the pumping-light generation section to the multiplexing port of the wavelength-division

multiplexer/demultiplexer by converting a path of the pumping lights, and for outputting optical signals outputted from the multiplexing port of the wavelength-division multiplexer/demultiplexer through converted paths for the optical signals; and, a plurality of wavelength-independent reflectors, each connected to the other side of one of the respective optical fiber amplifiers, for reflecting all optical signals including said optical signals that have a particular wavelength.

In related art, Inada et al. disclose a cross phase modulation suppressing device. Wherein, the optical signal enter port 1 of a circulator (read as, Optical path converter) and exit at port 2; signal from port 2 travels to a demultiplexer which demultiplexes the signal into multiple wavelengths; each wavelength then travels up a delay line and gets reflected back through the same delay line by a mirror (read as, wavelength-independent reflector. The reflected wavelengths are combined by a multiplexer; then travels back to port 2 of the circulator and exit through port 3 (abstract; figure 1; column 8 lines 12-50).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Inada et al. with Hidenori et al. as modified by Kyong et al. By using circulator the number of parts can be reduced, thus reducing cost. It is reduced because signals that are reflected from the mirror can travel backward in the same fiber and combined by the same multiplexer/demultiplexer unit; rather than signal travels through the delay fiber, get reflected and travel backward through a different fiber then combined by a different multiplexer. Using a mirror that reflects anything it sees are cheaper than a reflector that selectively reflects. When building a resonating cavity for a particular wavelength using two reflectors, there is only need to be one wavelength selective reflector; thus reducing the cost.

Consider **claim 2, and as applied to claim 1 above**, Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al., further disclose; wherein each reflectance (read as, reflection factor) of the wavelength-dependent reflectors (read as, reflectors 18-1 – 18-n); thereby enabling optical sources to be transmitted through the respective reflectors unilaterally or bilaterally; although, Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. did not explicitly disclose that each reflectance of the wavelength-independent reflectors are controlled independently, it could be understood that light source 14 enters the optical amplifier fiber 16 through reflector 16, thus the reflectively of reflector 16 can not be absolutely 100% (Hidenori et al; Drawing 1; paragraphs 0028 and 0031).

Consider **claim 3, and as applied to claim 1 above**, Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al., further disclose; wherein the wavelength-dependent reflectors comprise fiber-Bragg (read as, optical fiber grating) gratings which are each connected respectively to the demultiplexing ports of the wavelength-division multiplexer/demultiplexer (Hidenori et al.; Drawings 1 and 2; paragraph 0048).

Consider **claim 5, and as applied to claim 1 above**; Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al., further disclose; wherein the optical path converter includes an optical circulator (read as, optical circulator, 2) comprising: a first port (read as, port 1) for inputting pumping lights (read as, multiplexed optical signal enters port 1) generated from the pumping-light generation section; a second port (read as, port 2) connected to the multiplexing port of the wavelength-division multiplexer/demultiplexer; and, a third port (read as, port 3) for outputting the wavelength-division-multiplexed optical signals (Inada et al.; Figure 1; column 8 lines 12-50).

8. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Kyong et al. (Japanese Publication JP08162697)** and further in view of **Inada et al. (US Patent # 6,920,261)** and further in view of **Zhang et al. (US PGPub 2003/0179998)**.

Consider **claim 4, as applied to claim 1 above**, Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. disclose the invention as described above; except for, wherein the wavelength-dependent reflectors comprise thin film-filter reflectors which are each connected respectively to the demultiplexing ports of the wavelength-division multiplexer/demultiplexer and have respective thin film filters.

In related art, Zhang et al. disclosed in today's all-optical dense wavelength division multiplexing networks, three prevailing types of wavelengths selecting technology are use: 1) Thin Film Filter (TFF) (read as, thin film-filter reflector), (2) Arrayed Waveguide (AWG), and (3) Fiber Bragg Grating (FBG). Currently, TFF technology is the predominant choice when the spacing requirements of the wavelength selective device are greater than 100 GHz. The advantages of TFF-based devices are that they are relatively insensitive to temperature, have minimal cross talk, and provide good isolation between different wavelengths (paragraph 0003).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Zhang et al. with Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. Because the advantages of TFF-based devices are that they are relatively insensitive to temperature, have minimal cross talk, and provide good isolation between different wavelengths.

9. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Kyong et al. (Japanese Publication JP08162697)** and further in view of **Inada et al. (US Patent # 6,920,261)** and further in view of **Tomaru et al. (US PGPub 2003/0210730).**

Consider **claim 6, and as applied to claim 1 above**, Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. disclose the invention as described above; except for, the optical source generator further comprising a plurality of modulators for using wavelength-division-multiplexed lights passing through the wavelength-independent reflectors as individual optical sources.

In related art, Tomaru et al. disclosed an optical transmitter; wherein a multi-wavelength solid-state laser output the laser signal. The laser signal is separated into individual wavelengths; the separated wavelengths are feed into individual modulators. Wherein, the wavelengths are modulated with a data signal before transmission (Figure 13; paragraph 0043).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Tomaru et al with Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. Since data to be transmitted using WDM need to be first modulated only a wavelength. After producing a multiple separated wavelengths, then there must be a modulator so that data can be modulated into each wavelength for transmission over the WDM optical network.

10. **Claim 7 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Kyong et al. (Japanese Publication**

JP08162697) and further in view of **Inada et al. (US Patent # 6,920,261)** and further in view of **Caplan (US PGPub 2002/0167721)**.

Consider **claim 7**, Hidenori et al. clearly show and disclose; an optical source generator for wavelength-division-multiplexing optical communication systems, comprising: a pumping-light generation section (read as, excitation light source, 14) for generating and outputting pumping lights (Drawing 1; paragraph 0024); a wavelength-division multiplexer/demultiplexer (read as, Mul/Demul, 12), provided with one multiplexing port and a plurality of demultiplexing ports, for wavelength-division-multiplexing and outputting optical signals inputted into the multiplexing port, and for wavelength-division-demultiplexing and outputting optical signals inputted into the demultiplexing ports (Drawing 1; paragraph 0026); a plurality of wavelength-dependent reflectors (read as, reflective components, 18-1 – 18-n), each connected to one of the respective demultiplexing ports of the wavelength-division multiplexer/demultiplexer, for reflecting only optical signals that have a particular wavelength that corresponds to one of the respective said demultiplexing ports (Drawing 1; paragraph 0029).

Hidenori et al. fail to disclose; a plurality of optical fiber amplifiers, each having two sides one side of which is connected to one of the associated wavelength-dependent reflectors, for generating spontaneously emitted lights in response to pumping lights generated from the pumping-light generation section.

In related art, Kyong et al. disclose a variable wavelength multiwavelength optical fiber laser composition by the use of a single pump light. Wherein, the output from the pump light source is first demultiplex into a plurality of paths. Using a plurality of Erbium doped fibers

(read as, optical fiber amplifiers), signal from each path is amplify; then isolated and later filtered to form a plurality of optical wavelength (Drawing 1; paragraphs 0010-0012).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Kyong et al. with Hidenori et al. If an single amplifier is use to amplify every wavelength, there would be "bandwidth hogging". That is when a particular wavelength has higher intensity than other, and then when all wavelengths get amplified the wavelength with higher intensity will get amplify more; thus causing the higher intensity wavelength to hog the bandwidth. By using individual amplifiers for each wavelength, this problem can be eliminated.

Hidenori et al. as modified by Kyong et al. disclose the invention as described above, except for; an optical path converter for outputting the pumping lights generated and received from the pumping-light generation section to the multiplexing port of the wavelength-division multiplexer/demultiplexer by converting a path of the pumping lights, and for outputting optical signals outputted from the multiplexing port of the wavelength-division multiplexer/demultiplexer through converted paths for the optical signals; and, a plurality of wavelength-independent reflectors, each connected to the other side of one of the respective optical fiber amplifiers, for reflecting all optical signals including said optical signals that have a particular wavelength.

In related art, Inada et al. disclose a cross phase modulation suppressing device. Wherein, the optical signal enter port 1 of a circulator (read as, Optical path converter) and exit at port 2; signal from port 2 travels to a demultiplexer which demultiplexes the signal into multiple wavelengths; each wavelength then travels up a delay line and gets reflected back

through the same delay line by a mirror (read as, wavelength-independent reflector. The reflected wavelengths are combined by a multiplexer; then travels back to port 2 of the circulator and exit through port 3 (abstract; figure 1; column 8 lines 12-50).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Inada et al. with Hidenori et al. as modified by Kyong et al. By using circulator the number of parts can be reduced, thus reducing cost. It is reduced because signals that are reflected from the mirror can travel backward in the same fiber and combined by the same multiplexer/demultiplexer unit; rather than signal travels through the delay fiber, get reflected and travel backward through a different fiber then combined by a different multiplexer. Using a mirror that reflects anything it sees are cheaper than a reflector that selectively reflects. When building a resonating cavity for a particular wavelength using two reflectors, there is only need to be one wavelength selective reflector; thus reducing the cost.

Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. disclose the invention as described above; except for, an optical band pass filter, having two sides one of which is connected to the third port of the optical path converter, for passing through only the optical source bands; and, a second plurality of wavelength-independent reflectors, each connected to the other side of the optical band pass filter, for reflecting all optical signals including said optical signals that have a particular wavelength.

In related art, Caplan discloses the use of an optical band pass filter along with a Faraday mirror (read as, second wavelength-independent reflector) in a series combination. The function of the band pass filter is to allow the passage of only particular wavelengths, while the mirror reflects the allowed wavelengths backward (figure 6; paragraphs 0021 and 0059-0063).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Caplan with Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. Since the use of an optical filter at port 3 of the circulator and a single reflector provides the same results as when using a plurality of reflectors for each wavelengths; thus using only a single optical band pass filter and wavelength-independent reflector would reduce the number of parts and cost.

Consider **claim 8, and as applied to claim 7 above**, Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. and further as modified by Caplan, further disclose; wherein each reflectance of the first and second wavelength-independent reflectors is controlled independently, thereby enabling the optical sources to be transmitted through the respective reflectors unilaterally or bilaterally. Note, although Hidenori et al. does not explicitly disclose of two wavelength-independent with X% and Y% of reflectively, respectively; Hidenori et al. disclose the knowledge of using a X% and Y% reflectively that is less than 100%, so that signal can penetrate the reflectors and be received on the other side. Further, in combination of prior art teachings as described above, a person of ordinary skill in the art at the time of the invention would have known the number of wavelength-independent reflectors can be reduce by replacing them with a series combination of an optical band pass filter and a wavelength-independent reflector. Also the wavelength-dependent reflectors can be eliminated, by using an optical band pass filter.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Fischer et al.; 5,646,951

b) Frankel, Michael Y.; 6,100,831

c) ZENTENO, LUIS A.; 2002/0012378

d) Lee et al.; 2002/0176451

e) Berger et al. ; 2002/0164125

f) Jolley et al. ; 2002/0196528

g) Musk, Robert W. ; 2003/0012232

h) Sousa et al. ; 6,728,274

i) Bonaccini et al. ; 2004/0086004

j) Inada et al. ; 6,920,261

k) Hughes et al. ; 6,950,571

l) Zhang et al. ; 2003/0179998

m) Tomaru et al. ; 2003/0210730

n) Caplan, David O. ; 2002/0167721

12. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

13. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Perez-Gutierrez can be reached on (571) 272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le
August 16, 2006

RAFAEL PEREZ-GUTIERREZ
SUPERVISORY PATENT EXAMINER
8/18/06